THE ANODIC OXIDATION OF DIMETHYL SULFOXIDE

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Methanesulphonic acid (MSA) is widely used as a catalyst in reactions of nitriding, esterification, acylation, polymerization of olefins and can be used for preparation of electrolytes, for production of different pharmaceuticals in chemical, electronical and radiotechnical branches of industry. Appliance of electrolytes on methanesulphonic acid basis is undermined by its high price. That's why the research that aims at developing of effective technology of methanesulphonic acid production is relevant.

The anodic oxidation of dimethyl sulfoxide (DMSO) has been studied on a platinum and lead dioxide electrodes by voltamperometric method at the potentiodynamic mode and stationary polarization. The analysis MSA containing electrolyte after electrolyses was provided by cooling the solution containing DMSO and MSA to 283-285 K. At this temperature DMSO and MSA precipitate. After rinsing the sludge was dissolved in a warm water with further titration to determine the amount of MSA.

The analysis of volt-amperic curves on a platinum electrode in acid solution has shown that the molecules of DMSO are adsorbed on the anodic surface in a field of high positive potentials (1,9 – 2,1 V) that correlate to the oxidation of DMSO. For the further research was determined the range of current densities about 1200 – 1600 A/m^2.

The analysis of volt-amperic curves on a lead dioxide electrode has shown that the adsorption of the input substances is much higher that adsorption on a platinum electrode. High values of anodic potentials allow to conclude that the process of MSA production is carried with the formation of radical oxygen particles.

The current output was determined in electrolyzer with the separation of anodic and cathodic space by a cathionic membrane. The electrochemical synthesis of MSA has a high current output on platinum (88-92 %) and lead dioxide (more than 95 %) electrodes. But the adsorbing properties of a lead dioxide electrode are much better comparing with a platinum electrode. The further research will be aiming at determination whether the electrochemical oxidation of DMSO is carried directly on a anodic surface or it is carried through the electrochemical synthesis of catalyst – hydrogen peroxide.